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President  
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before the

SENATE COMMERCE, SCIENCE AND TRANSPORTATION COMMITTEE  
SUBCOMMITTEE ON AVIATION

The Honorable Slade Gorton, Chairman

concerning

Modernization of the Air Traffic Control System

February 26, 1998

Mr. Chairman, my name is Phil Boyer, and I am President of AOPA Legislative Action.

AOPA Legislative Action enjoys the financial support of 340,000 dues paying members. Together with our affiliated organization, the Aircraft Owners and Pilots Association, we promote the interests of those who contribute to our economy by taking advantage of general aviation aircraft to fulfill their business and personal transportation needs. More than half of all pilots in the United States are members of AOPA, making it the world's largest pilot organization.

Mr. Chairman, I am very pleased to be here today to discuss the modernization efforts of the Federal Aviation Administration.

As you and the other members of this Committee are aware, Mr. Chairman, air carriers depend the most on air traffic control, so modernization will affect them more than any other aviation segment. Our members constitute the bulk of aviators and flights in this country, yet we fly largely during visual flight rules conditions that require no air traffic control. This puts AOPA in a unique position. Though air traffic control has a relatively small utility to our members, it has a very large impact on the equipment we must buy and the procedures we must follow. Therefore, we dedicate a great deal of staff time to these problems, even though they primarily affect airlines. We aren't the problem, but we understand the problem, and we are in the position to speak to not only what is in the interest of our members, but to what is good for the entire aviation system.

This is a crucial point in the process of bringing the air traffic control system into the next century and retaining and improving the very high standards the public has set for it. We have a new FAA administrator who shows great promise in this crucial time. Unfortunately, over at the White House, the FAA's fate is wrapped up in other issues.

Evolutionary, Not Revolutionary, Approach

For years, AOPA has advocated a different vision for the future of aviation and the modernization of air traffic control. What is required from the FAA to implement our approach is a fundamental shift in attitude. Instead of pursuing

revolution, modernization requires evolution.

The revolutionary approach was tested by the original NAS plan. It attempted to throw massive sums of money at the FAA to totally restructure the ATC system all at once. Operating under the "Big Bang" theory, FAA sought as much money as it could, all up front, at the inception of the NAS plan in the early 1980s. The NAS plan ultimately failed when it couldn't support its own weight. The cost overruns are legendary - the initial price tag of \$11 billion, already a huge public works project, ballooned to over \$40 billion. Technology was obsolete before it was ready to use. FAA employees and contractors built careers on single programs or systems. The Microwave Landing System is a well-known example of a system that enriched contractors and built FAA careers, despite its near-universal rejection by the industry, and ultimately, it took Congressional intervention to kill it. As expected, much better, cheaper and more versatile technology is now coming on-line - the Global Positioning System, or GPS, which uses satellites for precision navigation.

The revolutionary approach requires that virtually every system be scrapped and replaced all at the same time, all while still providing a full level of service with zero tolerance for accidents, 24 hours a day, seven days a week. It amounts to remodeling a house by tearing it down to the foundation first before rebuilding it, while trying to live in it at the same time.

Not only are there other solutions to FAA's funding needs, but these solutions are readily available to the FAA. The technology needed to modernize the air traffic control system to meet future capacity demands and budget constraints, while enhancing the level of aviation safety, exists today. Most of it has been developed and tested, and the FAA can bring it on-line in time to meet capacity needs with much less money than anyone might expect. This scenario has been developed by The Mitre Corporation, and we think it holds tremendous promise.

The Mitre Corporation has identified four areas where technology that exists today can produce incremental change sufficient to handle future capacity needs and increase ATC system cost-efficiency, as well as providing substantial savings to the airlines. A Mitre Corporation report to FAA's National Airspace System Modernization Task Force presented November 3-4, 1997 identified these four initial technical enhancements to the air traffic control system - Collaborative Decision Making, Conflict Probe, Data Link, and Center TRACON Automation System. Mitre's plan simply takes advantage of the useful parts of the current system instead of scrapping the entire system and starting from scratch. It would incur dramatically smaller costs than even the original price tag for the NAS plan, and compliment FAA's urgent need to fund the replacement of the ATC host computer system by 2000. The airlines acknowledge the utility of these programs for reducing projected delays.

We are pleased with the overall direction that FAA Administrator Jane Garvey is taking on modernization. Her plan takes the "evolutionary, not revolutionary" approach to heart and relies on the Mitre proposal, which we have long advocated, for its guidance.

#### GPS/WAAS

Let me turn to the issue of the Global Positioning System (GPS) and the Wide Area Augmentation System (WAAS), a program that will have the largest impact on virtually every community in your respective states and our members. AOPA strongly supports the WAAS program, and we urge FAA and Congress to commit to timely and complete implementation of this system. We believe GPS/WAAS will

ultimately serve general aviation as a sole-means system for en route through Category I precision approach capability (200', 1/2 mile visibility minimums).

GPS is a navigation system with tremendous potential. Using a small receiver not much larger than a telephone, a user can locate his or her position within a 100 meter margin of error nearly everywhere on Earth. In aviation, the technology is being pushed to generate even greater levels of accuracy, and WAAS is the keystone program that will make revolutionary new aviation applications of GPS possible.

The purpose of the WAAS system is to augment the GPS signal and enhance the integrity, availability, and accuracy of the signal. WAAS will provide accuracy within at least 7.6 meters and often less than 2 meters. Air carrier autoland systems require less than two meters accuracy and extremely high availability, which will be provided by Local Area Augmentation Systems (LAAS). The hope is that WAAS will lead us towards ultimately using augmented GPS as a "sole means" system for en route, terminal, non-precision, and Category I precision approaches. Its precision approach capability as well as its ability to complement terrain avoidance equipment holds the potential to significantly decrease the rate of controlled-flight-into-terrain accidents, which is one of the most vexing safety challenges and is high on FAA's list of priorities.

GPS will provide tremendous benefits for many users in many transportation modes and other functions for a relatively low cost. Aviation, highways, maritime, railroads, agriculture, surveying and mapping, communications, and utilities will all benefit. It will also make the similar Coast Guard system unnecessary. Even some automobiles have GPS navigation systems. My car is equipped from the factory with GPS, and more are coming out each and every year. The moving map displays my GPS only position near the road; with GPS/WAAS my position would be displayed on the road; and with a GPS/LAAS my position would be on the actual lane of a multi-lane highway.

While use of GPS for en route navigation is already becoming popular, the more precise and corrected signals needed to support instrument approach capability provided by WAAS will ultimately provide the basis for a reliable all-weather system. The major aviation benefit of GPS will be the availability of precision navigation to all airports in low visibility conditions. Today, this is possible only with significant investment, making it impractical and unaffordable to thousands of general aviation airports.

An instrument landing system (ILS), the technology currently used for airport approaches in poor visibility conditions, costs about \$1.5 million per runway end. Many airports in small communities who want to attract business find this cost prohibitive. WAAS will make category I ILS unnecessary. WAAS will position GPS as a universal, standard navigation system. It will also permit the eventual decommissioning of most existing ground-based navigational aids in addition to ILS and ultimately consolidate avionics systems in general aviation and regional air carrier aircraft.

Currently, GPS is used as a supplemental system for en route through non-precision approach. By supplemental we mean that aircraft operating under Instrument Flight Rules (IFR) must carry alternative navigation equipment in addition to GPS.

The Mitre proposal suggests completing Phase I of the WAAS program, reprogramming funding for Phases II and III (now called Phase E) and delaying full scale development to help fund replacement of the ATC host computer system.

However, this plan if enacted verbatim would force FAA to default on their contracts, and terminate the program.

Phase II of the program consists primarily of software development necessary to continue towards full system capability. The continued software development under Phase II must be done whether just initial (Phase I) capability is implemented or full scale system capability is implemented. It provides:

- \* performance improvements carried over from Phase I development,
- \* notices to airmen (NOTAMS) of system status,
- \* system security ,
- \* protection from intentional/unintentional frequency interference (jamming and spoofing),
- \* software maintenance capabilities needed to turn the system over to the FAA, and
- \* maintains the U.S. leadership in what is estimated to be a \$50 billion market over the next seven years.

Presumably, the idea behind this proposal is to deploy an initial WAAS capability on schedule and delay implementation of full system capability one or two years. By initial capability we mean that GPS, augmented by WAAS, will continue to be a supplemental system for en route through non-precision approach with the addition of limited Cat I precision approach capability, and aircraft would continue to be required to carry other navigation equipment. Limited Cat I service means Category I precision approaches will not be available a total of at least 18 days of the year throughout the central 50% of the continental U.S. (95% availability), and likely more than two months in other regions of the country (80% availability). In comparison, full WAAS operational capability, Cat I service will be available throughout the U.S., with the exception extreme northern Alaska, all but a total of 8 hours of the year. With limited implementation, users will not be able to gain experience necessary to convince them to transition to GPS as a sole-means system.

It is our understanding that to go from initial operational capability to full operational capability requires the following elements none of which are contained in the 1999 budget:

1. redundant ground communication networks (Phase II)
2. two or three additional satellites to improve availability and provide redundancy (O&M deployed under Phase III), and
3. up to 25 additional ground reference stations.

These elements of the program may be less sensitive to funding cuts, however, they come in later stages of the program. So it is not clear to us how this will help with the near-term funding shortage for the host computer replacement.

Additionally, the total cost of these elements will likely amount to less than \$50 million (or 5% of system implementation costs), but may have significant short and long-term cost repercussions.

Delaying implementation of GPS/WAAS as at least a primary means system will

raise questions of government's commitment to completion of the program. As a result, manufacturers may be reluctant to invest in avionics development and production, users will be hesitant to equip, and the transition to satellite navigation cannot begin. Program costs will rise further, and FAA and the users will be faced with the enormous expense of continued maintenance of the current ground-based system.

Even minor cuts could be penny-wise and pound-foolish. For example, cutting FY 1999 by as little as \$20 million could delay final implementation by one year and increase total program cost. Continued maintenance of the old navigation aid equipment would also need to be extended by one year at a cost of well over \$150 million.

In addition, virtually no operation improvements would be implemented. An example of things that would not get done include airport surveys, instrument approach procedure development, procedure flight checks, an FAA navigation data base dissemination system, GPS interference work, and development of a GPS frequency policing system. These are what provide the benefits of having the system in place. Without them, we will have a great system in place of which we will no be able to take full advantage.

In order to realize the full operational benefits of WAAS, the Federal Aviation Administration must not be allowed to fall behind in its programs to exploit the potential applications of GPS. What is required of the FAA is not only to provide the augmented signal, but to provide the operational benefits to users. Otherwise, we will have a new navigation system that requires costly new equipment, but provides no added user benefit, and therefore fails to reach a reasonable cost-benefit ratio.

The federal government is not the only investor in a modernized navigation system. The users will also make a significant investment. For that reason, the provision of user benefits must keep pace with the implementation of WAAS. For example, in 1993 the agency announced the availability of overlay instrument approaches - which are GPS approaches designed to duplicate or "overlay" existing non-precision approach procedures already designed by the FAA using conventional navigation technologies. Although it gave users a chance to experiment with GPS approaches, it provided little operational benefit.

In 1995, the FAA began publishing new non-precision GPS approaches, and has pledged to continue publishing new GPS approaches at the rate of 500 a year until all qualified runways are served. At that rate, the FAA will barely be able to replace the instrument approaches we have today by 2006. It is approaches to airports currently without one that provides the greatest user benefits.

When I was in the television broadcasting industry, we had to convince viewers to replace their black & white TVs with color sets. Well, to do that, we didn't keep putting on shows in black and white; we gave them more color programs and specials so more and more people would buy the new color sets. A similar approach will be needed in the transition to the recently approved High-Definition TV. The FAA needs to approach the transition to GPS in the same manner. Greater emphasis must be placed on developing these new approaches if users are to be encouraged to make the transition to this new technology. This will require greater investment in airport and runway surveys, obstruction clearance, and lighting systems.

To publish these new approaches quickly, the FAA must place greater emphasis on developing and applying more streamlined, automated methods of designing and

certifying airspace procedures and investigate new ways of doing business. For instance, the FAA should use private contractors to develop new approaches. Without a sufficient number of newly commissioned approaches, one of the most important benefits of GPS technology cannot be realized.

Mr. Chairman, the WAAS program is very sensitive to cuts. We are concerned that anything but very minor cuts would jeopardize the entire program, and deprive aviation and other user communities of an extremely valuable service. Considering the tremendous potential of WAAS, this Committee should carefully scrutinize any proposal to limit the capability of this program. Our commitment to a system that could soon satisfy almost every navigation requirement, from cross-country to precision approaches, should not go just halfway. The FAA's goals should be complete coverage of WAAS for Category I precision approaches across the continental United States.

We are very pleased that DOT is revisiting its plan to terminate Loran C service in 2000. . AOPA has repeatedly urged the DOT to continue LORAN C service until augmented GPS system proves itself ready serve as a sole-means navigation system for general aviation and users are prepared to reap the benefits., This is another reason it is critical to see the WAAS program through to completion. The longer we delay, the more it will cost to maintain current systems.

Retaining Loran C until sole means GPS/WAAS is in place also provides the assurance that a complimentary navigation system will be available if for any reason GPS/WAAS does not ultimately satisfy that role. AOPA is convinced Loran C would fill that need better and more cost effectively than any other available.

Mr. Chairman, I would like to request that the Committee support full development of WAAS as part of its FAA reauthorization bill this year, and carefully scrutinize any proposed cuts.

#### Flight 2000

Flight 2000 as it is currently named is a program that has experienced difficulties due mainly to a lack of focus on its purpose. The Mitre Corporation has called for redefining the objective of Flight 2000 to serve as a tool to mitigate risk in future communication, navigation and surveillance programs. While we generally support that concept, the program must have stated specific objectives and a schedule. The program remains unfocused and undefined. FAA needs to state the nature of the data link with aircraft. Will it be voice only, data only, or both? What surveillance tactics do they envision? The Administration is requesting \$90 million to fund the program for FY99, and \$300 million over four fiscal years. This is a significant amount of money that should be justified with a solid program that enjoys a clear objective. Also, we understand that 40% of this request is for equipment acquisition. The Committee should closely scrutinize acquisition for Flight 2000 and whether it is appropriate for the government to purchase equipment for use on private carriers. I should add that the status of Flight 2000 should not affect that decision to go forward with WAAS.

FAA must assure that a consensus has developed in the aviation community before pursuing Flight 2000. Otherwise, it could balloon into another "big bang" program.

Let me close by summarizing: using an evolutionary, not revolutionary, approach, modernization of the air traffic control system can and ought to be achieved

without expenditures on a titanic scale.

Mr. Chairman, this concludes our comments. Thank you again for the opportunity to present our views. I will be happy to respond to any questions.